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INTRODUCTION

Norton Sound

The Norton Sound section of the Northern district in Area Q is described in the shellfish regulations as all waters east of 168 degrees W. long., between the latitudes of Cape Romanzof and Cape Prince of Wales (Figure 1). The only shellfish fishery in Norton Sound is for red king crab (Paralithodes camtschatica). Blue king crab (P. platypus) and Tanner crab (Chionoecetes opilio) also occur within this section but are very seldom caught by commercial or subsistence fishermen. Red king crab have been utilized for subsistence purposes by local residents for many years, but the commercial fishery was not initiated until 18 years ago. In April 1977, the Alaska Board of Fisheries opened an "exploratory" commercial fishery in order to increase the knowledge and commercial utilization of Norton Sound king crab. Since 1976 there have been six National Marine Fisheries Service (NMFS) research trawl studies in Norton Sound. The most recent survey was conducted in 1991 (Table 3, Figures 3 & 4). In addition, the State of Alaska Department of Fish and Game (ADF&G) has conducted four research pot fishing studies. Data from population studies, from winter research studies, mining impact studies, and from 17 commercial fishing seasons has greatly increased the knowledge of the Norton Sound king crab. There are two seasons during which crab may be taken commercially: November 15 - May 15 and July 1 - September 3.

St. Lawrence Island

The St. Lawrence Island section lies immediately west and north of the Norton Sound Section. Until recently, the St. Lawrence Island section has been managed by Westward Region's Dutch Harbor office since the Bering Sea crab fleet bases there and has been open to commercial fishing for the same amount of time as the Norton Sound section. The only reported commercial catches to date in the St. Lawrence Island section were made in 1983 when 52,557 pounds of blue king crab were delivered from 13 landings, in 1989, when 3,603 pounds of red king crab and 984 pounds of blue king crab were delivered from 8 landings and in 1992 when 53 pounds of blue crab were landed.

In 1983 the commercial crab fleet concentrated near the southeast shore of St. Lawrence Island. The following year a regulation proposal to close the waters within 10 miles of all inhabited islands within the section was adopted in an attempt to protect stocks targeted by local fishermen and reduce impacts on subsistence marine mammal harvests during the winter. During the 1989 season, relatively few blue king crab were taken near rocks

and shoals still open to commercial fishing, but red king crab were discovered in low densities near Kivalina, the northern boundary of the section. The villagers of Little Diomede Island have also traded and sold winter caught blue king crab with residents of Nome and other villages for years. The Department has not been able to obtain an accurate record of the magnitude of this trade. The remoteness of this village is also a factor contributing to the lack of catch records. Current regulation allows the commercial harvest and sale of king crab near shore during the winter. The Board provided the same provisions in the regulation as are in effect for Norton Sound to allow a commercial winter fishery. However, local residents of St. Lawrence Island have decided not to export any of their winter catch for commercial sale.

COMMERCIAL FISHERY

Norton Sound Summer Commercial Fishery

The 1994 Norton Sound section commercial red king crab season opened by regulation at noon, July 1. A total of 85 catcher vessels composed of herring gillnetters and seine vessels were registered for the fishery. However, 34 vessels made deliveries and 52 permits were fished. There was some crew turnover and several fishermen made deliveries to document their participation in the summer fishery should it become important in the future. The first two vessels registered on June 24. The last vessel to register did so on July 27. More than half the registered vessels were from eastern Norton Sound villages. Most intended to fish in the vicinity of their respective villages. A total of 55 fishermen in eastern Norton Sound registered for the 1994 fishery. Early on in the season, eastern Norton Sound fishermen made an attempt to harvest crab in the areas closest to their villages, but were generally unsuccessful. Fishermen gave up or moved their effort to the Nome area where the fishery historically occurred. The season was open for 31 days and was closed by emergency order at 6:00 p.m. ADT, Sunday, July 31, when it was anticipated a harvest of 340,000 pounds of legal male king crab would be reached. The closure announcement was made with 72 hours notice, between 4:00 p.m. and 6:00 p.m. July 28.

All fishermen returned their fish tickets prior to August 2. The total reported harvest was 327,858 pounds including the reported deadloss of 986 pounds. The average price paid per pound of landed crab was $2.02 per pound. Catches this season were reported from nine statistical areas (616331, 636401, 636402, 646401, 646402, 656401, 656402, 666401, and 666402). The fleet averaged 9.3 legal crab per pot pulled; 108,824 crab were harvested in 11,729 pot lifts. The average weight of legal male crab was 3.1 pounds, 0.2 greater than the previous season.

Catch sampling was done by a single ADF&G port sampler stationed in Nome. This person was also placed on board small catcher vessels

four times throughout the fishery. A total of 404 legal male crab, 879 sublegal male crab and 131 female crab were sampled for legal size, sex, and biological length and condition. The mean carapace length for legal male crab was 119mm; the recruit and postrecruit proportions were respectively 14% to 86%. This represents the lowest recruitment level since 1983 and roughly 39% of the 1983 - 1993 recruit average (36%). Sublegal crab sampled were also comprised of an unusually high number of skipmolts.

The Norton Sound guideline harvest level of legal male red king crab for the 1994
season was 340,000 pounds. This conservative quota was set prior to the season using preliminary data from the fall 1991 National Marine Fisheries Service (NMFS) trawl survey, which placed the current population size at about 1/3 of the historic population level. The population of legal male crab has remained fairly stable since 1985 with only a limited increase in the number of legal king crab. Exploitation levels were maintained near 15% until 1988 when concern about a decline in the number of legal males resulted in the exploitation rate being reduced. The guideline harvest level of 340,000 pounds equated to an exploitation of approximately 10%. Authority for establishing a lowered exploitation rate was set by the Alaska Board of Fisheries during the spring 1988 meeting, which amended the existing harvest strategy regulation 5AAC 34.080.

Board of Fisheries regulations specific to Norton Sound Section are:

1) 5AAC 34.925 (i) and (j), requiring pot tags and limiting vessels of 125 feet in length or less to 40 pots each and larger vessels are limited to 50 pots.

This new regulation, 5AAC 34.925, along with a regulation making Norton Sound a superexclusive registration area, adopted by the Board of Fisheries in March of 1994, was responsible for the change in character of the fishery during the 1994 season. As a result of these changes, many large vessel owners apparently felt their vessel would not be able to compete economically under the new pot limit and exclusivity requirements. No large vessels participated in the 1994 fishery.

2) 5AAC 34.915, which directs the Department to manage the Norton Sound summer king crab fishery for a harvest of one-half the exploitation rate determined under 5AAC 34.080.

This regulation has been in place since 1982. The original intent was to reserve one-half the harvestable surplus for the summer fishery and the other half for the traditional winter subsistence and commercial fisheries. The combined winter fisheries have averaged a harvest of less than one percent of the legal biomass since the regulation was passed. The regulation has had the effect

of increasing the rate of catch in the winter fisheries and the Norton Sound legal biomass has roughly doubled in the years since the enactment of this regulation.

3) 5AAC 34.935, which established a closed area with a defined boundary approximating 15 miles from the beach in the Norton Sound section, to protect a long established winter subsistence fishery.

Regulation 5AAC 34.935 (CLOSED WATERS) also allows the Department the flexibility to reduce the closed waters area to allow an efficient harvest of red king crab during the summer fishery. Under the revised summer season management plan for 1995, the regulatory season dates were modified by setting the opening one month earlier. The decision to relax the closure line to roughly 10 miles from the beach was announced June 28. Catch rates had been slow in early July, but were increased as the closure line was relaxed. Therefore, the earlier timing of the fishery combined the seasonal migration of legal crab was thought to have resulted in the lower catch rates. An increased catch rate should have occurred by allowing fishing nearer shore on the crab concentration that had supported the fishery since 1978. A second emergency order relaxing the closure line in eastern Norton Sound was announced July 8. Catch rates had been quite slow, and residents of eastern Norton Sound villages had requested that commercial fishing be allowed in areas accessible to their villages. They had hoped to discover a second concentration of crab in previously unfished waters.

Unavoidable delays in the 1994 fishery were caused by two storms. The first storm kept the fleet in port one day, July 23. Most vessels anticipated the second storm on July 31, and the majority of the pots were pulled July 30. Some pots were lost during the 1994 storms. During past seasons,larger boats have continued to fish during milder storms or short seasons were allowed to occur after storms.

This was the first commercial summer crab season during which a significant portion of the harvest was processed in Nome. Approximately 36 percent of the harvest or 117,799 pounds were processed in Nome. Two shore based processors operated in Nome, and three other buyers flew crab to Anchorage to be processed. Eleven fishermen were registered as catcher sellers. The following is a breakdown of fishing effort by fishing group origin:

Fishing Group	# of Boats	Pounds of Crab Harvested
Norton Sound	18	59,415
Yukon Delta	9	142,613
Alaska-non local	3	32,417
Non-Alaskan	4	93,413

The good weather allowed department staff to board for tank inspections and registrations of all vessels. Fisher and Buyer cooperation and compliance with the verbal catch reporting was good. Fish and Wildlife Protection utilized a King Air aircraft to fly the closed waters on July 6. The Nome Fish and Wildlife officer also boarded vessels throughout the season to enforce size and sex restrictions.

Norton Sound Winter Commercial Fishery

Regulation allows a winter commercial fishery in the Norton Sound Section from November 15 through May 15 which typically takes place near Nome. The winter commercial fishery is required to take place from the ice, not from vessels. During the winter of 1993-1994, 25 commercial fishermen reported selling a total of 5,649 red king crab (Table 2). The villages east of Nome reported harvests of crab for the third year in a row. Although ice conditions were unfavorable in the Unalakleet and Shaktoolik area, Elim reported four percent of the harvest and a small harvest was reported from the vicinity of St. Michael. The harvest is split between local residents who buy crab directly from the fishermen and Anchorage and other non local markets. Crab are sold in Nome for six dollars per crab, while in Anchorage the price is approximately $3.50 per pound, resulting in an average price of $3.01 per pound for all the commercial product. The 1993-1994 winter catch of 17,214 pounds was estimated to be worth about 51,814 dollars.

The winter crab fishermen generally use crab pots but some use handlines to "prospect". Deploying pot through sea ice is laborious, but hand lines can be dropped through a large ice auger hole in a short period of time. The other advantage of hand lines is that during periods of favorable weather hand lines may be deployed from new, less stable ice without the risk of loosing more expensive crab pots. Most fishermen consider commercial crabbing a sideline and hold other jobs. Usually, two or three of the winter crab fishermen sell the majority of the crab. Because the volume of crab involved is low, no processor has found it profitable to operate locally. The crab sold locally are all sold fresh as are those shipped to Anchorage or other non local markets. During the mid-winter months fishermen find it difficult keeping the crab from freezing. Many Nome residents prefer to buy frozen crab since they are able to extract the meat prior to cooking. Fresh frozen crab are easily marketed in Nome but are not accepted in Anchorage markets.

SUBSISTENCE FISHERY

Red king crab are utilized by Norton Sound residents mainly during the winter. Fishing occurs through cracks or holes cut in the ice

with the use of handlines and pots. In order to document trends in the subsistence harvest, the Board of Fisheries enacted a regulation in 1977 requiring subsistence fishermen in Norton Sound to obtain a permit prior to fishing and to record daily effort and catches on these permits (Table 2).

During 1978, the first year subsistence permits were required, the highest number of permits issued to date and a relatively high harvest rate were recorded. The fishery declined sharply the following year and remained at very depressed levels throughout the 1981-82 season. The lack of success in the winter crab fishery during some past years has been attributed to a declining crab population. The decline was caused by removal of crab in the summer commercial fishery together with low recruitment, low effort due to poor ice conditions, and changes in the nearshore winter distribution of crab. These factors, in varying degrees, may have had some influence on the success of the winter fishery.

During the 1978-79 winter fishery, the king crab population was still in relatively high abundance. Despite this relatively large population, winter catches were the poorest on record indicating that the major factors limiting winter catches were probably poor ice conditions and the distribution of crab. During the winter of 1981-82, poor winter catches could more reasonably be attributed to a declining crab population since the crab population was at its lowest documented level. Subsistence fishing success during the winters of 1982-83 through 1986-87 had improved due to a rebuilding of the population and increased use of more efficient gear (pots instead of handlines). Unstable ice conditions and record snowfalls adversely effected the 1987-88, 1988-89, and 1992-93 catches. During years of stable ice conditions, the catch for approximately 100 fishermen has averaged 100 crab (Table 2).

The winter crab fishery is limited by extreme weather conditions. Unstable shorefast ice can carry crab pots away or fishermen are unable to cross open leads to retrieve their pots. Low air temperatures, wind and drifting snow rather than crab densities are the primary factors that determine effort levels.

STOCK STATUS / RESEARCH

In 1976, when monitoring of the Norton Sound king crab population first began, the population was mainly composed of prerecruit and recruit crab (Figures 4 & 5). The initial population assessment survey by the NMFS estimated the legal male king crab population at 8.1 million pounds. The legal male crab population peaked in 1978 at an estimated 11 million pounds. During the 4 years following 1978, recruitment into the legal male crab population was very low. Subsequent NMFS surveys in 1979 and 1982 documented a population of predominantly postrecruit crab, and estimated the population had

declined to 2.6 million pounds by 1982. The Department of Fish and Game conducted their first population assessment survey in 1980, with subsequent surveys in 1981 and 1982 (Table 3). These survey assessments documented a similar decline from 6.6 million pounds (1980) to 1.3 million pounds (1982). Beginning in 1981, sublegal crab abundance began to increase, and by 1983 recruitment into the legal male population also began to increase. No assessment work was conducted in 1983 or 1984. However, samples of the commercial catches have indicated a significant increase of recruit crab into the legal male population; from a historic low of 10% in 1981 to 59% in 1984 (Table 4).

In 1985 both NMFS and ADF&G conducted population assessment surveys in Norton Sound (Table 3, Figure 5). The Department fished 65 stations throughout Norton Sound capturing 4,645 legal males, of which one-third was tagged. Subsequent recapture of tagged crab by the commercial fleet in August of 1985 provided tag to untagged ratios, employed to estimate the population prior to the fishery at 2.4 million pounds (Table 3). After the commercial fishery in 1985, NMFS conducted a population assessment survey using trawl gear over a slightly larger area than that surveyed by the Department. Male king crab sampled in NMFS trawls were in the process of or had just molted with the result being that their estimate of 3.4 million pounds of legal male king crab included some recruitment. Adjusting this estimate for molting, and including the summer commercial harvest, an estimate of 3 million pounds present prior to the 1985 August fishery was developed. Both surveys documented relatively substantial numbers of recruit crab and a healthy percentage of prerecruit crab.

During September of 1988 NMFS conducted a fourth population assessment with trawl gear. They sampled an area roughly the same size as in 1985, but increased sampling frequency in the proposed mineral lease area near Nome. The timing of the study, which occurred during the male molt, was almost a month earlier than similar surveys in the past. Nearly all the 1988 catch was in pre-molt condition. NMFS estimated 3.0 million pounds of legal male and 1.0 million pounds of prerecruit-one male red king crab; totaling 4.0 million pounds. Annual mortality was estimated at approximately 20% or 0.8 million pounds. Ignoring growth and the winter harvests, the population prior to the 1989 summer fishery would have been 3.2 million pounds, very close to the 1985 trawl estimate of 3.4 million pounds.

NMFS conducted a fifth trawl survey of Norton Sound during late August 1991 with a reduced number of tows. Each station had only a single sampling tow as compared to each station having both a day and night tows during previous surveys. This reduction in sampling had the effect of introducing more variability into the estimate. The legal crab biomass in the summer fishing area was estimated to be 3,400,000 pounds and the total Norton Sound legal biomass was estimated to be 4,009,000 pounds. Since the survey occurred prior

to the molt, a mortality of 10% was assumed for the year following the estimate. With no summer or winter fishery data to compare with the survey results, a conservative biomass of 3,400,000 pounds was used as the basis for the 1994 harvest guideline. The Norton Sound red king crab population was thought to be stable with harvest set near 10%.

In-season sampling during the 1994 summer commercial fishery showed the lowest rate of recruitment of legal males since 1983 when data collection began. The incidence of skipped molts was double that of the long term average. Although no changes in the female indices were noted, that data base is less extensive. It appeared that recruitment did not keep pace with harvest and natural mortality during the 1993-94 season. The Norton Sound population has been considered to be depressed and rebuilding since 1983.

A second concern is the rate of mating success will decline if a minimum level of large males is not maintained. Because data to support this concern was based on a small sample size and because the incidence of molting might increase, no changes in management have been announced. A winter sampling project is planned to evaluate recruitment during March. A management plan for the summer of 1995 will be announced after the results of that study are available.

FUTURE INVESTIGATIONS

In addition to the population surveys, the Department has run a winter crab tagging project with winter pot gear fished through the ice near Nome from 1983 through 1991 and in 1993. The winter crab studies began as an index of near shore crab abundance during the season of heaviest local subsistence use. Documentation of crab abundance is important because it provides an objective comparison of crab availability to an important subsistence fishery. Controversy over the availability of the crab resource to the local subsistence fishery is likely to continue in the future especially if winter crab harvests decline even for a short time. Unfortunately, the winter project was dropped in 1993 due to budget cuts. The staff was able to demonstrate using past years' data that winter age/length data is significantly correlated to commercial catch data.

Without current research studies such as the ADF&G surveys conducted in 1980-82, and 1985, and the NMFS trawl surveys conducted in 1976, 1979, 1982, 1985, 1988, and 1991, it will be very difficult to determine whether the legal male crab population of Norton Sound is being exploited at a level which will allow the population to stabilize and rebuild. The winter project will be implemented for the spring of 1995. It is intended to evaluate the

level of recruitment and skip-molting after the October male molt. The 1994 summer season sampling indicated very little recruitment from the 1993 molt and the possibility of decline in the abundance of legal males.

Norton Sound has been included in the budget increment proposed to the legislature. Both funding for a sustained winter program and an annual trawl survey to evaluate Norton Sound crab populations are part of that proposal.

OUTLOOK FOR 1995

The outlook for 1995 is uncertain. The low level of recruitment found from the samples collected during the 1994 summer season is reason for concern. If the winter sampling project indicates the trend of poor recruitment is carried over through the 1994 molt, harvest levels may be reduced. A combination of time and area restrictions are likely if the trend continues. No decisions will be made until after the results of the winter project are available in early April.

Table 1. Summer commercial red king crab harvest and effort, Norton Sound, 1977–1994.

Year	Days Fished	Number of Vessels	Total Number of Pots	Average # of Pots per Vessel	Range of Pots Per Vessel	Number of Pot Lifts	Crab Per Pot	Commercial Harvest[a]
1977	60	7				5,457	36	0.52
1978	60	8				10,817	64	2.09
1979	16	34				34,773	28	2.93
1980	16	9				11,199	29	1.19
1981	38	36				33,745	11	1.38
1982	23	11				11,230	6	0.23
1983	3	23	3,583	156	68–290	11,195	12	0.37
1984	13.6	8	1,245	156	70–250	9,706	14	0.39
1985	21.7	6	1,116	186	106–280	13,209	11	0.43
1986	13	3	578	193	85–278	4,284	38	0.48
1987	11	9	1,430	159	75–287	10,258	10	0.33
1988	9.9	2	360	180	110–250	2,350	32	0.24
1989	3	10	2,555	256	67–432	5,149	15	0.25
1990[b]	4	4	1,388	347	288–400	3,172	19	0.19
1991[c]	0	0	No Season			0		0
1992	2	27	2,635	98	35–100	5,746	4	0.07
1993[d]	58	14	560	40	40	7,063	16	0.33
1994[d]	31	34	1,360	40	40	11,729	9	0.33
Average	23	14	1,528	164		11,240	21	0.69
Range	0–60	0–36	360–3,583	40–347		2,350–34,773	6–64	0.19–2.93

[a] Harvest in millions of pounds.
[b] All vessels participating were catcher/processors.
[c] No summer season.
[d] All vessels registered 40 pots; however, many vessels did not fish 40 pots all season.

Table 2. Winter commercial and subsistence red king crab harvests, Norton Sound 1978-1994.

COMMERCIAL			SUBSISTENCE						
Year[1]	Fisher-men	#Crab Harvested	Winter[2]	Permits Issued	Permits Returned	Permits Fished	Total Crab Caught[3]	Total Crab Harvested[4]	Average Harvest/fm
1978	37	9,625	1977-78	290	206	149	[5]	12,506	84
1979	1	221	1978-79	48	43	38	[5]	224	6
1980	1	22	1979-80	22	14	9	[5]	213	24
1981	0	0	1980-81	51	39	23	[5]	360	16
1982	1	17	1981-82	101	76	54	[5]	1,288	24
1983	5	549	1982-83	172	106	85	[5]	10,432	123
1984	8	856	1983-84	222	183	143	15,923	11,220	78
1985	9	1,168	1984-85	203	166	132	10,757	8,377	63
1986	5	2,168	1985-86	136	133	107	10,751	7,052	66
1987	7	1,040	1986-87	138	134	98	7,406	5,772	59
1988	10	425	1987-88	71	58	40	3,573	2,724	68
1989	5	403	1988-89	139	115	94	7,945	6,126	65
1990	13	3,626	1989-90	136	118	107	16,635	12,152	114
1991	11	3,800	1990-91	119	104	79	9,295	7,366	93
1992	13	7,478	1991-92	158	105	105	15,051	11,736	112
1993	8	1,788	1992-93	88	79	37	1,193	1.097	30
1994	25	5,753	1993-94	118	95	71	4,894	4,113	58

[1] Prior to 1985 the winter commercial fishery occurred from January 1 - April 30; as of March 1985, the winter commercial harvest may occur from November 15 - May 15.

[2] The winter subsistence fishery occurs during months of two calendar years (as early as December, through May).

[3] The number of crab actually caught; some may have been returned.

[4] The number of crab "harvested" is the number of crab caught and kept.

[5] Data unavailable.

Table 3. Results of the population assessment surveys conducted for red king crab in Norton Sound since 1976.

					Number of Red King Crab Captured[a]			Population Estimates of Legal Male Crab[c]	
Year	Date	Research Agency	Vessel	Gear Effort	Sublegal Males	Legal[b] Males	Females	Numbers	Pounds
1976	9/02 - 9/05 9/16 -10/07	NMFS	Miller-Freeman	Trawl 158 tows	768	555	180	3,119,800	8,111,480
1979	7/26 - 8/05	NMFS	Miller-Freeman	Trawl 71 tows	46	194	40	837,241	2,511,723
1980	7/04 - 7/14	ADF&G	Altair	Pots 397 lifts	443	3,290	158	1,900,000	6,600,000[d]
1981	6/28 - 7/14	ADF&G	Altair	Pots 718 lifts	4,097	3,415	1,933	1,285,195	4,755,221
1982	7/06 - 7/20	ADF&G	Aleutian #1	Pots 689 lifts	5,019	2,001	424	353,273	1,271,783
1982	9/05 - 9/11	NMFS	Miller-Freeman	Trawl 50 tows	322	107	265	970,646	2,620,744
1985	7/01 - 7/14	ADF&G	Arctic Sea	Pots 642 lifts	6,086	4,645	181	907,579	2,414,644
1985	9/16 -10/01	NMFS	Argosy	Trawl 78 tows	266	163	151	1,203,000	3,369,000
1988	8/16 - 8/30	NMFS	Miller-Freeman	Trawl 82 tows	258	141	218	1,037,000	3,038,000
1991	8/22 - 8/30	NMFS	Ocean Hope	Trawl 53 tows	202	178	105	1,384,000	4,009,000

[a] Number of crab captured on ADF&G surveys represent data standardized for a 24 hour soak.

[b] Legal male red king crab were defined as at least 106mm in carapace length for the 1976 NMFS survey; 105mm for the 1979 and 1985 NMFS survey; and at least 121mm in carapace width for all ADF&G surveys.

[c] Population est. are valid for the date of the survey, ie either before or after the summer commercial fishery.

[d] The 1980 estimate has been revised from the original estimate of 13.4 million pounds. The original estimate was thought inaccurate due to under-reporting of recovered tagged crab.

Table 4. Comparison of percent recruit and post-recruit king crab sampled from the summer commercial fishery and winter research, Norton Sound, 1983-1994.

Year	Winter Research Recruits (%)	Winter Research Post-recruits (%)	Summer Commercial Recruits (%)	Summer Commercial Post-recruits (%)
1977			53	47
1978			29	71
1979			33	67
1980			15	85
1981			10	90
1982			27	73
1983	73	27	55	45
1984	54	46	59	41
1985	68	32	45	55
1986	55	45	48	52
1987	18	80	22	78
1988 1/			25	75
1989	43	53	23	77
1990	49	51	21	79
1991	52	48	1/	
1992 2/			28	72
1993	20	80	31	69
1994 2/			14	86

1/ No data collected in winter 1988 due to unstable ice conditions

2/ No data collected in the winters of 1992 and 1994 due to a lack of funding.

Recruits = All new shell, legal size, male crab of carapace length <116mm.

Postrecruites = All other legal size male king crab.

Table 5. Percent age composition of red king crab from winter research pots (percent by size categories[1]), Norton Sound, 1983-1994.

	SUBLEGAL			LEGAL		
Year	Prerecruit Twos	Prerecruit Ones	Totals	Recruits	Post Recruits	Totals
1983	26	38	64	26	10	36
1984	35	31	66	19	16	35
1985	25	45	70	20	10	30
1986	26	35	61	22	17	39
1987	13	31	44	11	45	56
1988[2]						
1989	27	15	42	27	31	58
1990	16	33	49	25	26	51
1991	5	30	35	34	31	65
1992[3]						
1993	3	9	12	17	71	88
1994[3]						

[1] Sublegals = male king crab less than 4 3/4" carapace width.
Pre-recruit Ones = Sublegals greater than 89mm in carapace length.
Pre-recruit Twos = Sublegals smaller than 90mm in carapace length.

Legals = male king crab greater than 4 3/4" carapace width.
Recruits = Legal new shell crab smaller than 116mm in carapace length.
Post-recruits = all non-recruit legal males.

[2] No data collected in 1988 due to poor ice conditions.

[3] No data collected in 1992 and 1994 due to lack of funds for a winter project.

Table 6. Winter subsistence red king crab catches and effort by gear type, Norton Sound, 1993-1994.

Gear Type	# Fisher-men	# Males Caught	# Males Kept	# Females Caught	# Females Kept	Total Crab Captured	Total Crab Kept	Average Harvest/fm[1]
Pots	55	4,374	3,851	253	253	4,627	3,878	71
Handlines	8	73	69	13	6	86	75	9
Both	2	122	115	14	0	136	115	58
Unknown	6	45	45	0	0	45	45	8
Totals	71	4,614	4,080	280	33	4,894	4,113	58

[1] Harvest refers to crab that are kept.

* Total permits issued 118, 95 permits returned, 17 permits not returned, 6 permits voided (as of 12-1-94).

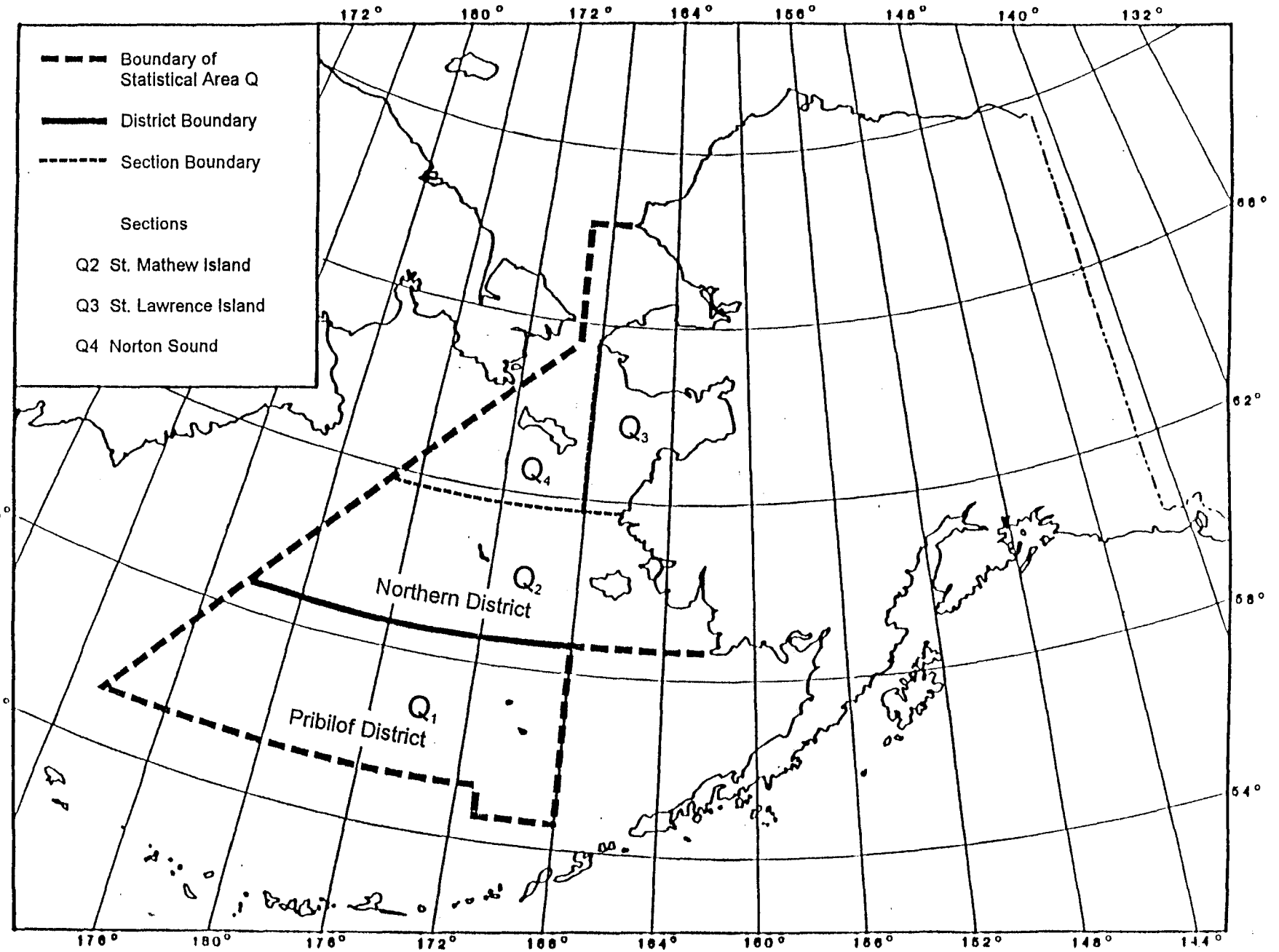

Figure 1. King crab fishing districts and sections of Statistical Area Q

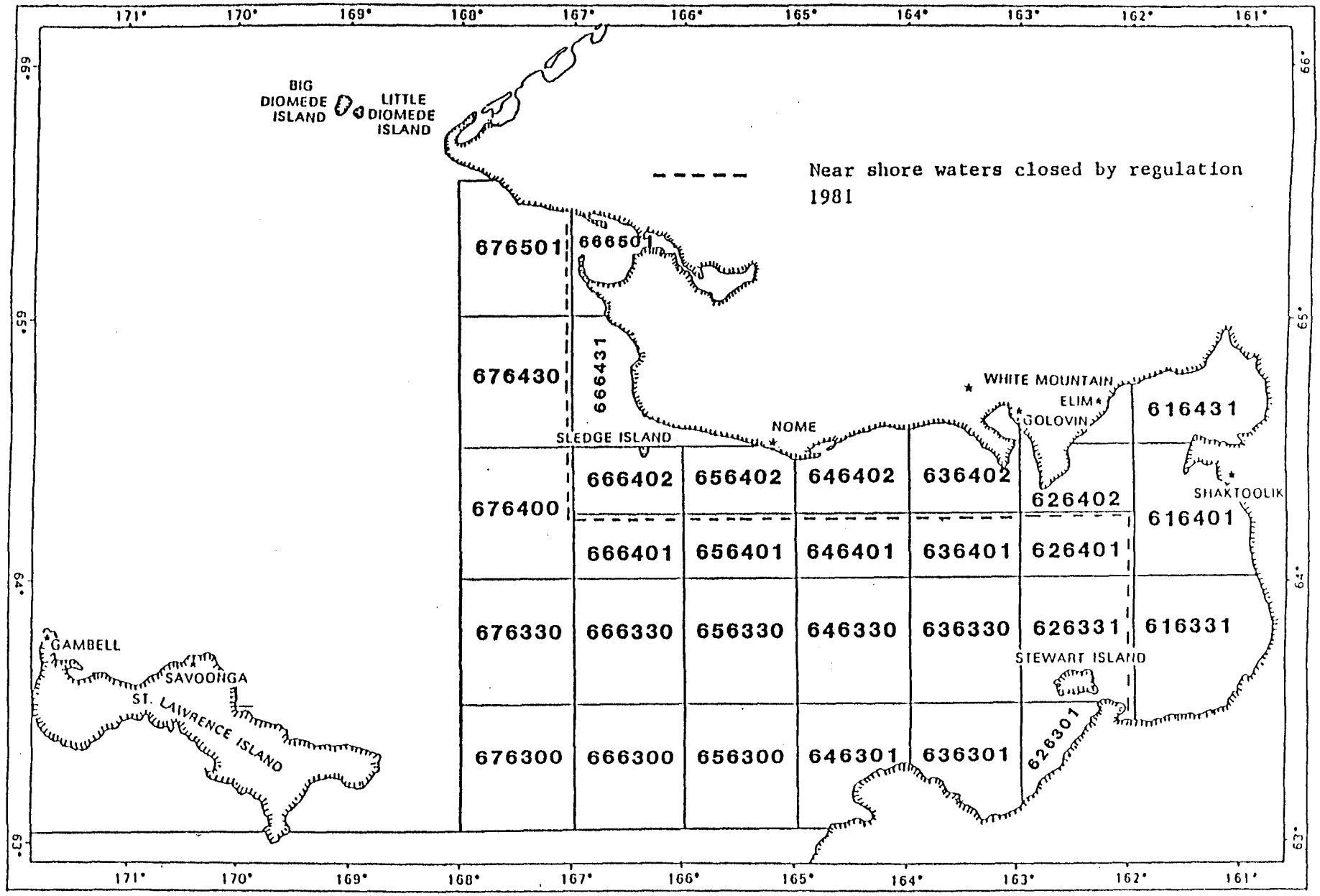

Figure 2. Statistical areas for the Norton Sound red king crab fishery.

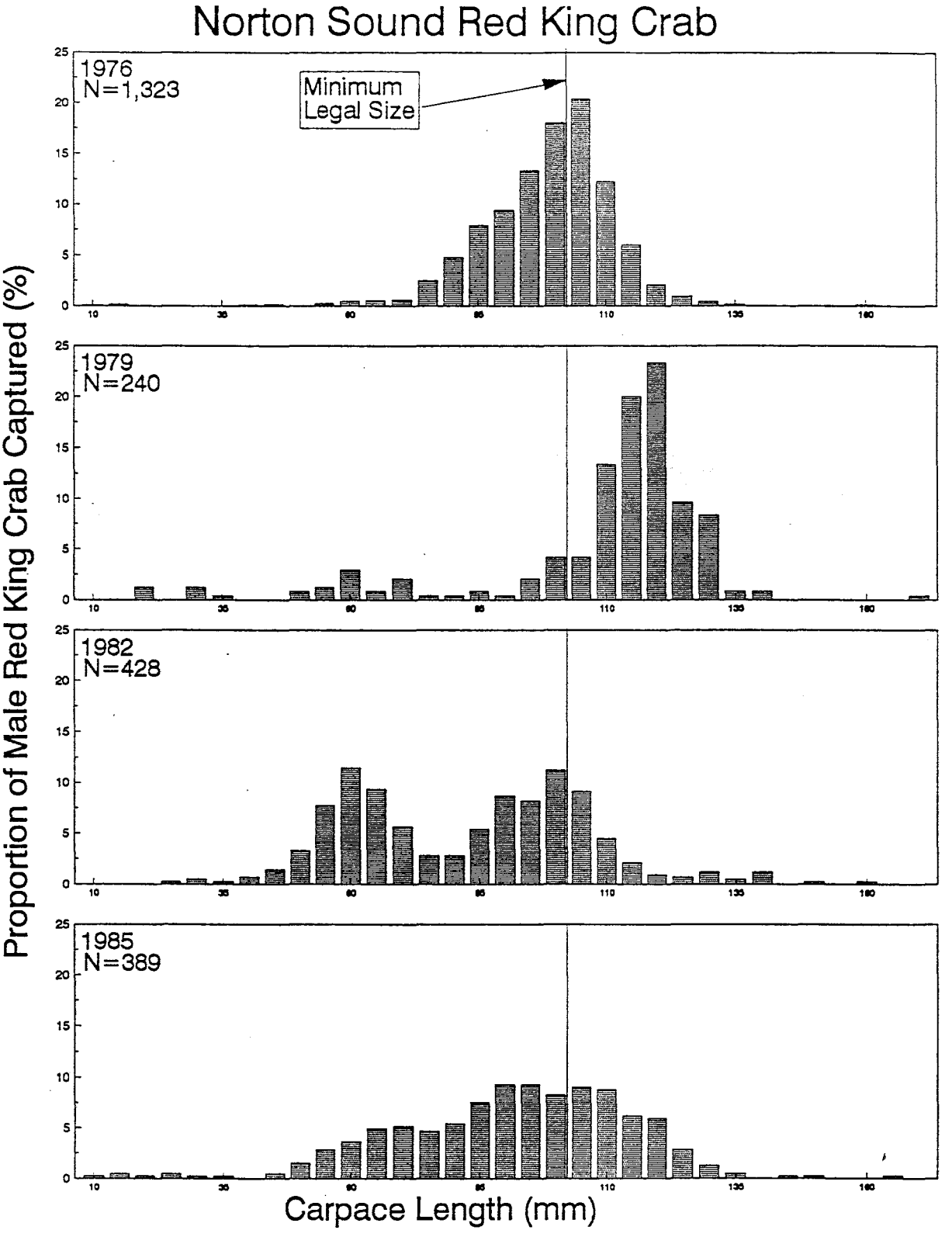

Figure 3. Norton Sound male red king crab size distribution from trawl assessment surveys conducted by the National Marine Fisheries Service, 1976, 1979, 1982, 1985, 1988, and 1991.

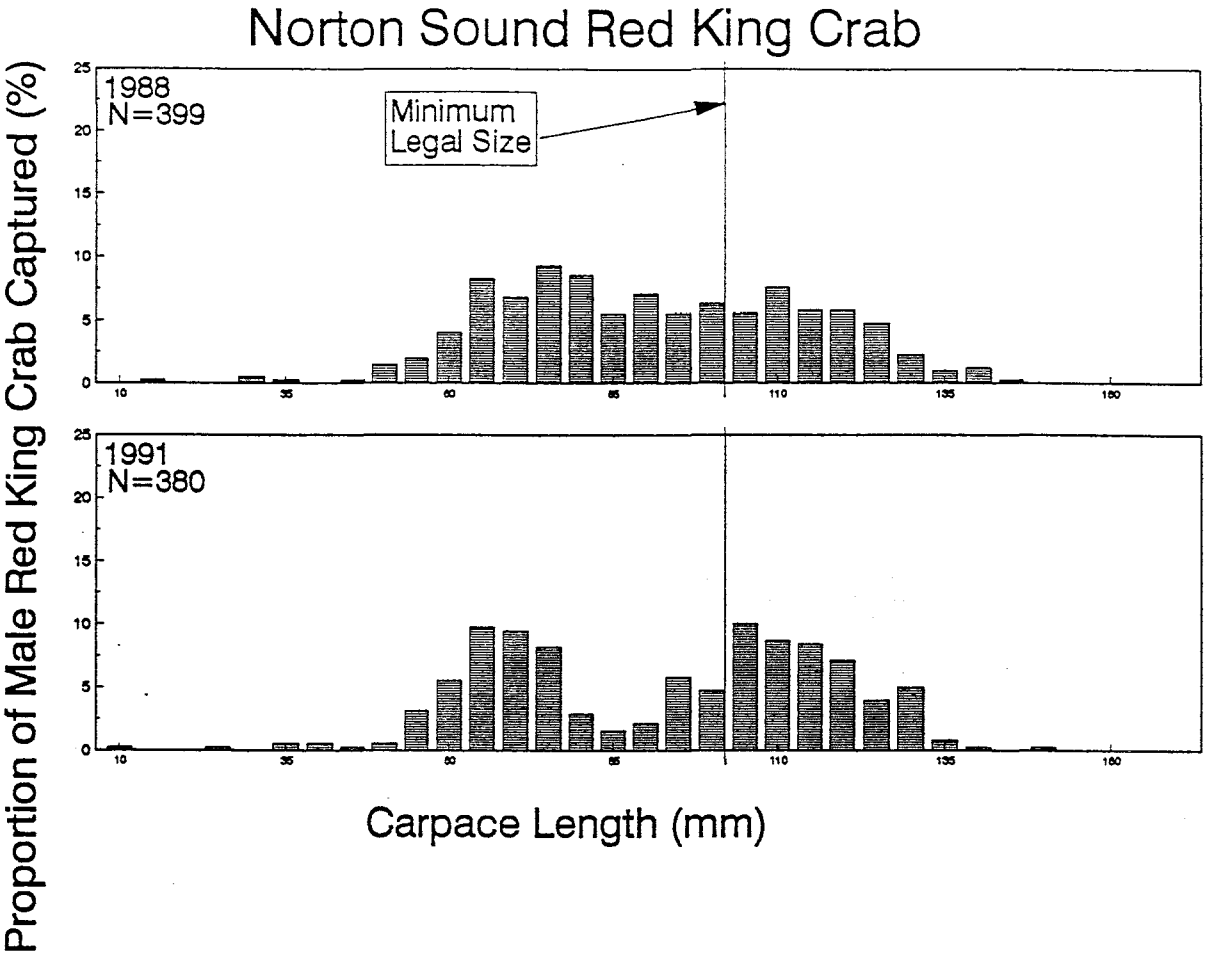

Figure 3. (Page 2 of 2)

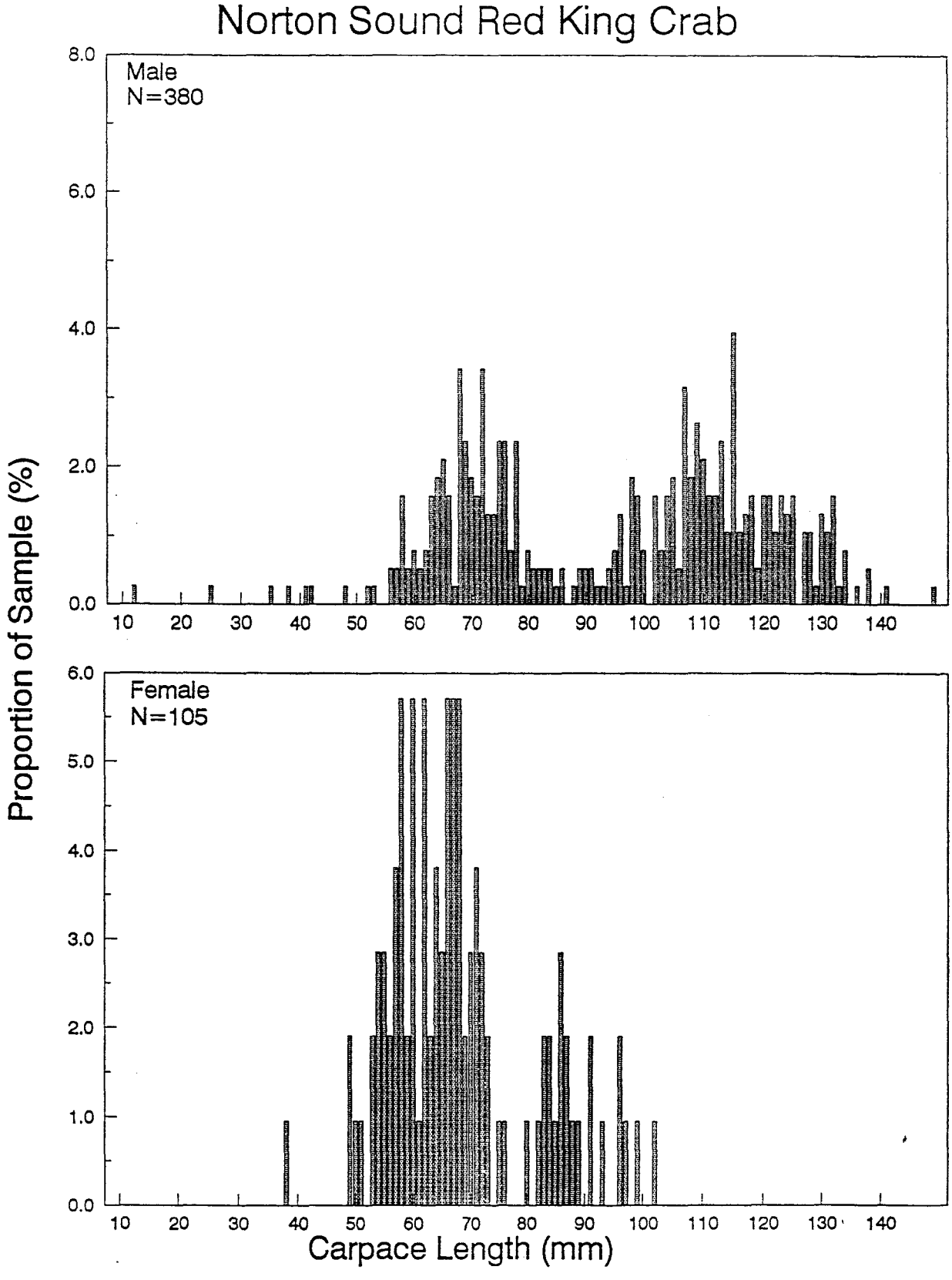

Figure 4. Norton Sound male and female red king crab size distribution from a trawl assessment survey conducted by the National Marine Fisheries Service, 1991.

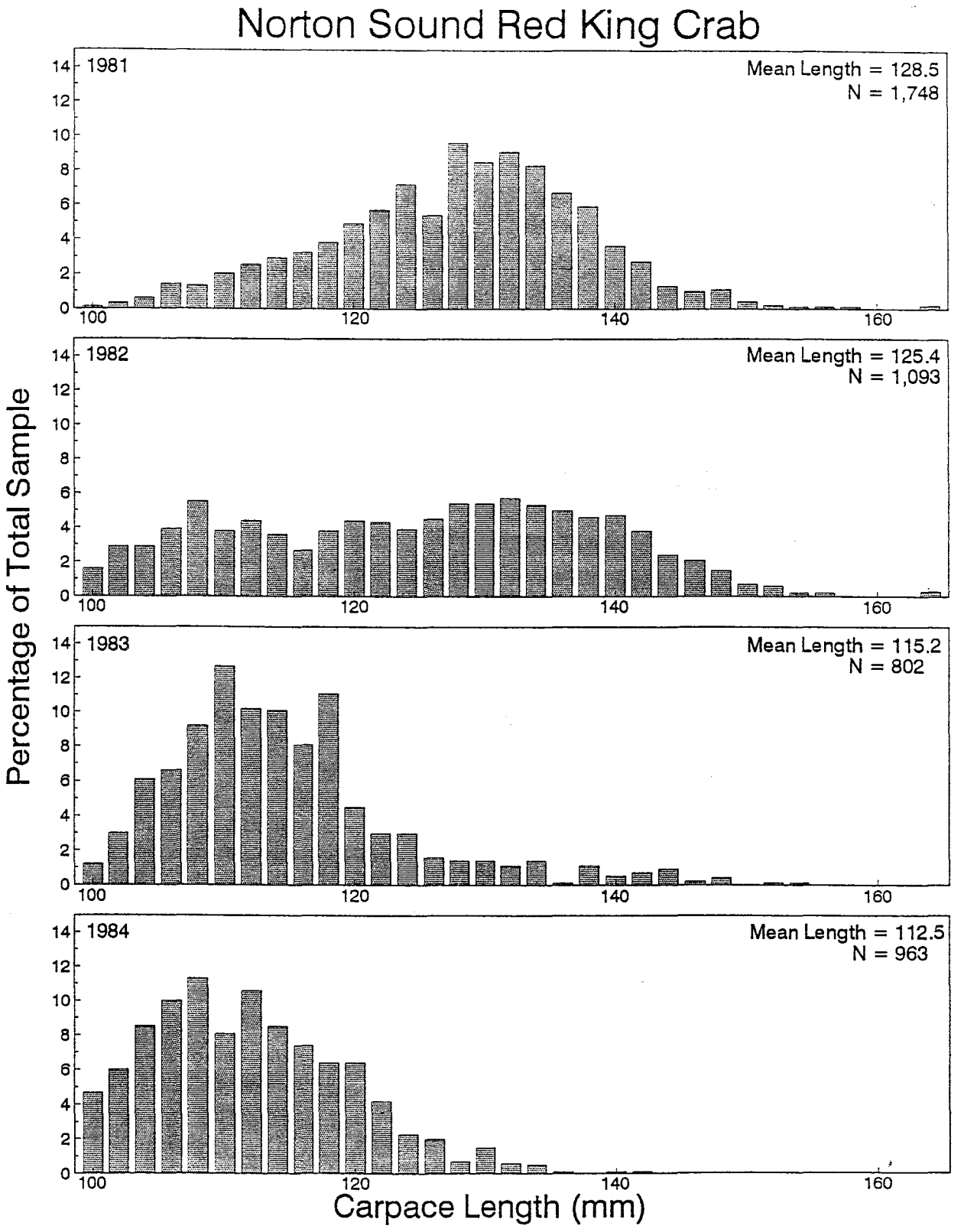

Figure 5. Norton Sound red king crab summer commercial catch samples, 1981-1994 (There was no commercial fishery in 1991).

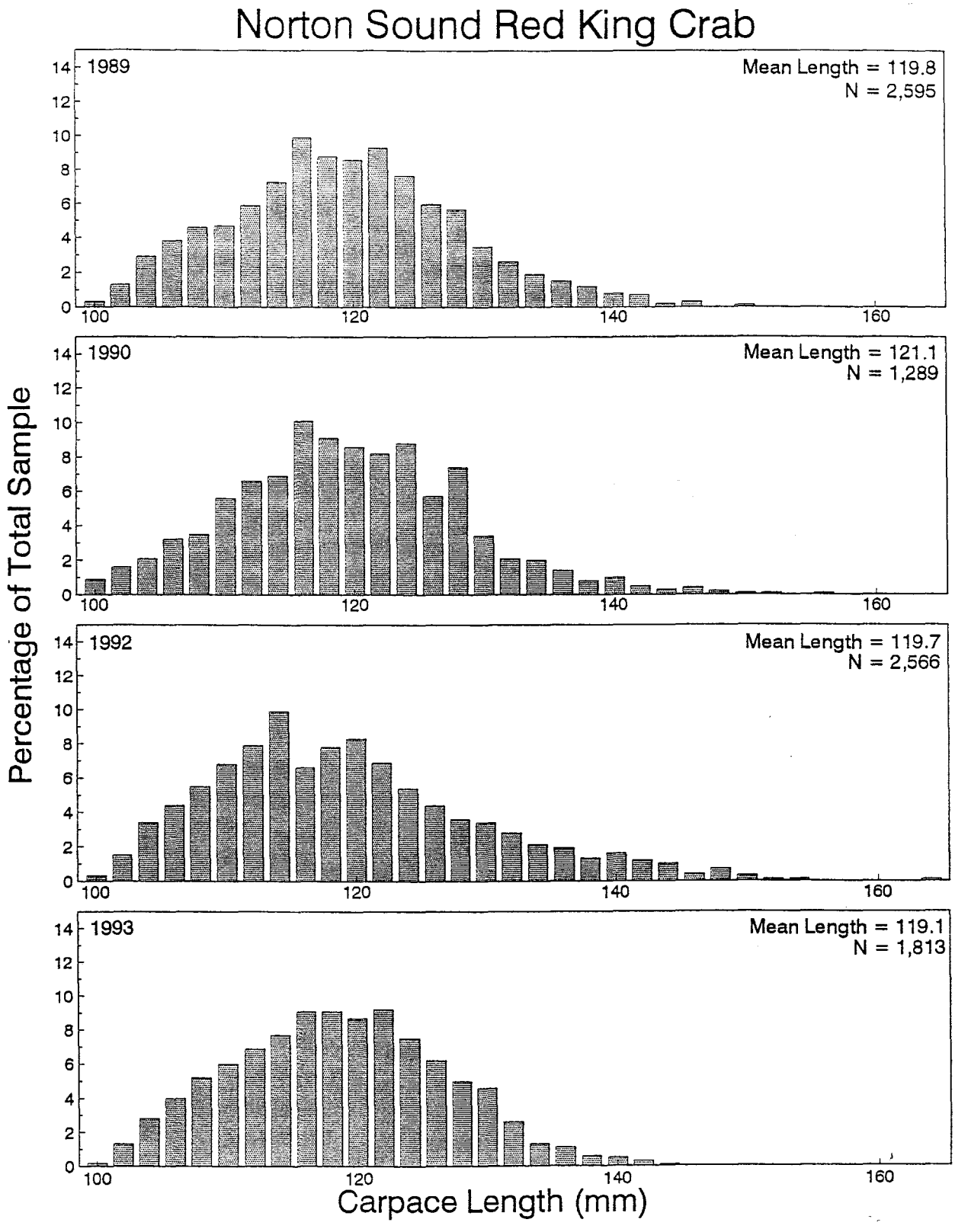

Figure 5 . (page 3 of 4)

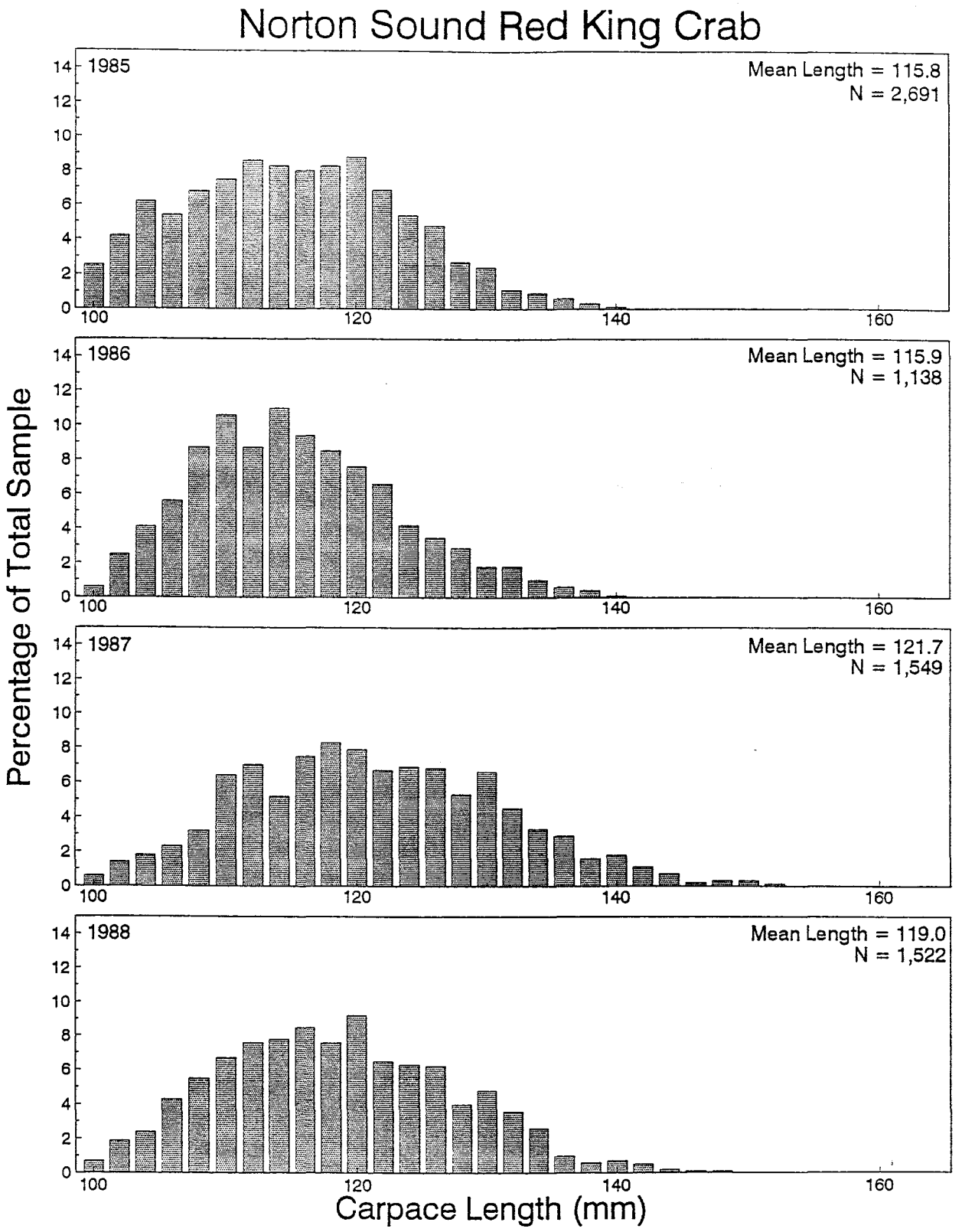

Figure 5 . (page 2 of 4)

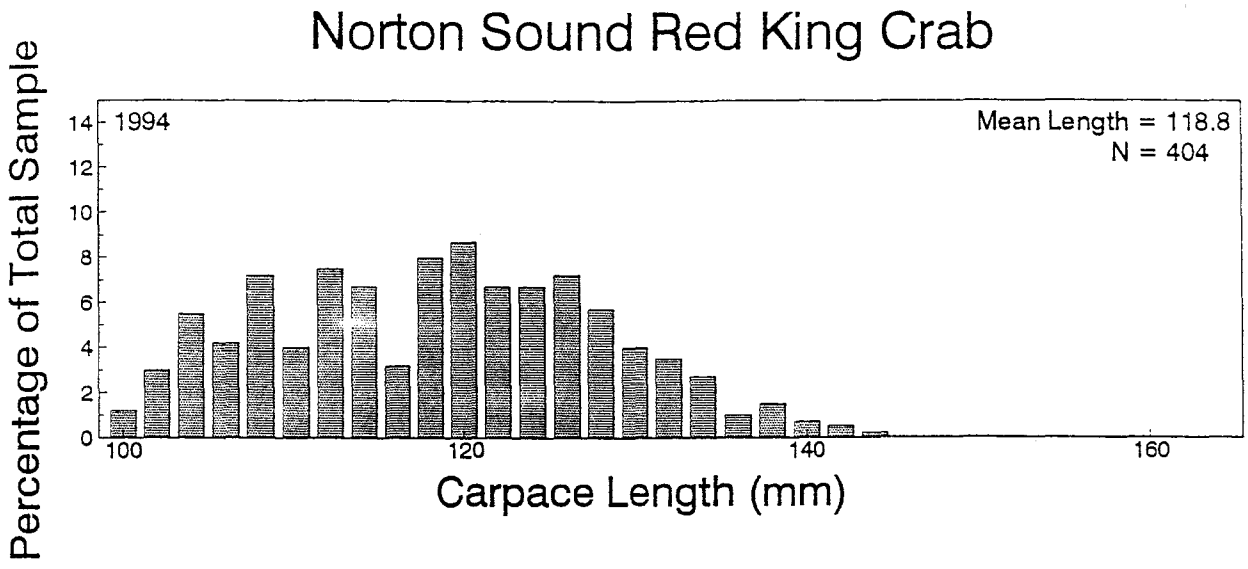

Figure 5. (page 4 of 4)